Unit 1: Linear Patterns, Expressions, and Functions

Working with patterns is at the heart of mathematics. Generalizing involves seeing patterns. The language of Algebra can be used to describe such generalizations. Exploring patterns is a vehicle to provoke thing about variable, equivalent expressions, and functions. So, we begin our study of linear functions by working with patterns.

Concepts are introduced in this unit so that they can be discussed and solidified throughout the year. Students should be at a developmental level at the end of this unit, but perhaps will not have attained full mastery of all concepts.

Students should understand

* Variables and how we use them.
* Equivalent expressions.
* Connection between repeated addition and multiplication.

Students should be able to

* Write an equation for a linear function.
* Identify the dependent variable and place it on the vertical axis.
* Create multiple representations of a simple linear function.
* Identify the rate of change from a picture, verbal description, equation, table, and graph.
* Identify the zero step from a picture, verbal description, equation, table, and graph.
* Differentiate between discrete and continuous functions when given a context and show how this is reflected on the graph.
* Determine if a function is linear using a graph.
* Determine if a function is linear using a table.
* Interpret an ordered pair in context.

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| Day | Lesson | Objective |
| 1 | Painting Towers | Set expectations for group work. |
| 2 | Painting Towers: Multiple Representations | Introduce functions and multiple representations. |
| 3 | The Border Problem | Write equivalent number expressions. |
| 4 | The Border Problem: Changing the Grid Size | Write equivalent variable expressions |
| 5 | Simplify Expressions | Simplify equivalent expressions using the distributive property. (Support students when distributing a negative and multiplying binomials.) |
| 6 | The Border Problem: Multiple Representations | Revisit functions and multiple representations. |
| 7 | Tiling a Garden Patio | Different strategies for representing a pattern. |
| 8 | Exploring Patterns | Finding growth rate and zero step. |
| 9 | More Practice Exploring Patterns | More practice finding growth rate and zero-step. |
| 10 | Test Review |  |
| 11 | Test |  |